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# Time-Frequency Analysis from Earthing Application



Jun Hou Ting, Mahfuzah Mustafa, Zarith Liyana Zahari, Dwi Pebrianti, Zainah Md Zain, Nurul Hazlina Noordin and Rafiuddin Abdubrani

**Abstract** Body earthing or grounding means that connecting the body in direct and uninterrupted contact with the earth by touching the soil, sand, water, or a conductive surface that is in contact with the earth. By earthing the body, positive charge can be neutralized and return the body to a neutral state as the positive charge that builds up can lead to health problems. There are few types of time-frequency analysis method such as Gabor, Wavelet and Wigner. The experiment of body earthing is done by recording the EEG signal from human brainwave with the Emotive EPOC Headset. To remove the noise of the signals, in pre-processing stage is important to separate the signal into two band frequency band which are alpha band and beta band with the threshold of signal amplitude was set to  $-100$  to  $100 \mu V$ . Then the peak points were plotted into a histogram to compare the changes of the Alpha and Beta band signals. Lastly, the results of before body earthed and after body earthed were compared through the histogram plotted. The result shows that, before the body earthed, the Alpha band signals are low, while the Beta band signals are high. Then after body earthed, the Alpha band increased, while the Beta band are decreased. From the result show that the body earthing reduced the stress of the student.

**Keywords** EEG signal · Time frequency · Gabor transform · Wavelet transform · Wigner transform

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